REMARKS

Before discussing the rejections of the present section, a brief review of applicant's invention is in order.

Applicant provides a Compact Microscope Imaging System (CMIS) for tracking cells and having machine vision techniques for autonomously scanning, identifying, detecting, tracking, and analyzing microscope specimens for selected characteristics or features. The CMIS provides intelligence to allow experiments, including identifying selected characteristics or features of interest of various objects, to be conducted without the need of constant or even human monitoring and thus, is considered to operate autonomously.

As discussed on page 12 of applicant's specification, the practice of the invention uses machine vision routines or techniques and creates a relational database of the features identified by the humans. These features serve as a baseline input feature set and are used with adapted neural networks of the present invention. The practice of the invention develops a machine vision technique that is used to identify an input feature set, but also has an ability to learn how to adapt to various changing inputs to produce an optimum output. The CMIS controls, monitors and may run virtually any microscope or video microscope experiment autonomously. The overall effect of the practice of the present invention is that experiments, that used to take weeks or even months to analyze

manually, can now be accomplished in a manner of minutes or hours for longer experiments.

Claims 1, 3-5, 7-10, 12-14, 16-18 and 20-23 stand rejected under 35 USC §103(a) as being unpatentable over Greenwald et al (U.S. Patent 6,330,106B1) in view of Ferguson (U.S. Patent 5,784,193). Applicant respectfully disagrees with this rejection for the reasons given below.

The Examiner in his rejection refers to Ferguson as teaching the use of a non-human adaptive neural network to control the machine vision of a microscope (col. 2 line 60-col.3 line 21). This is an error, because Ferguson is a neural network (see col.2 lines 60 and 61), not an adaptive neural network as recited in applicant's independent claims.

Applicant on page 11, line 11 through page 12, line 20 teaches the benefits of an adaptive neural network as follows:

Adaptive neural networks are essentially probabilistic computations or techniques that are used to adapt neural networks for automated control tasks. A basic neural network approach is to accept several inputs (N) and based on an error relationship produce a finite set of outputs (M). The difficulty in using basis neural networks is that the results can be unpredictable and the neural network may fail to yield an optimal solution if conditions suddenly change. However, when adaptive neural networks are implemented as for the present invention, the "best case" scenario is optimized by a set of

learning behaviors built into the neural network. Just as humans adapt to a changing environment, so can an adaptive neural network. Such is the case in the practice of the present invention with regard to the technique of auto-focus, auto-image scanning and the detection of defects. Rather than have several inputs mapped to a finite set of outputs (M), an adaptive neural network takes several inputs (N) and maps them to a set of outputs (M+1), with the (+1) referring to a new case that can be optimized/defined in the future.

The practice of the present invention uses inputs or features that a human would use to identify, detect and classify objects, cells and areas of interest. These are represented by the initial sets of images that are received. The practice of the invention uses image processing techniques and creates a relational database of the features identified by the humans. These features serve as a baseline input feature set and are used to train/teach the adaptive neural network preferably used in the practice of the invention. The practice of the invention develops a machine vision technique that is used to identify the input feature set, but also has the ability to learn how to adapt to various changing inputs to produce an optimal output. For example, let's take a group of cells that have 4 defects in each cell. A standard neural network technique, as well as an adaptive neural network technique, will identify only cells with 4 defects. Now for example, take a group of cells with 7 defects in them. A standard neural network technique will output no cells identified or label all cells as having only 4 defects, which would be a gross misrepresentation of the data. However, an adaptive neural network technique practiced by the present invention outputs cells with 4, 5, 6, or 7 defects since

it has the ability to reason or adapt to the changing number of defects. One of the machine vision routines is related to interface detection of colloidal hard spheres systems.

From the above, it is seen that Ferguson suffers the above drawbacks by using a fixed neural network, whereas the present invention utilizes an adaptive neural network to accommodate changing conditions and is not burdened with the prior art drawbacks.

Assuming for the sake of discussion that the Examiner's references of Greenwald and Ferguson are combinable, even though neither reference make such a suggestion, the resulting combination would not be that of the present invention because it would be devoid of an adaptive neural network.

For the sake of completeness, it should be noted that U.S. Patent 4,965,725 of Rutenberg was cited as an adaptive neural network in the Office Action of September 6, 2005, for U.S. Patent Application Serial No. 11/053,759 which is a divisional of the present invention. The Examiner in the Office Action of September 6, 2005, refers to column 2, lines 21-35, of Rutenberg as a teaching of a adaptive neural network. This is in error because like Ferguson, Rutenberg only mentions neural networks, not an adaptive neural network and, therefore, all of the hereinbefore described prior art drawbacks of neural networks of Ferguson are equally applicable to Rutenberg.

Nothing in any of the Examiner's references including Rutenberg, taken alone or in combination, teaches, suggests or renders obvious applicant's independent claims 1,

10, and 18 reciting, in part, "providing a computer....comprising routines for providing machine vision techniques....,said machine vision techniques including routines for adaptive neural networks that operatively control said robotic system; ....

Claims 3-5, 8-9, 12-17 and 20-23 are dependent on either independent claims 1, 10 or 18, and thus in the context of their independent claims recite further details of applicant's invention. These dependent claims are considered patentably distinguishable for the reasons given for their independent claims.

Nothing within the four corners of Greenwald et al and Ferguson devoid of non-human adaptive neural networks teaches, or suggests the subject matter of claims 1, 3-5, 7-10, 12-14, 16-18 and 20-23.

For the reasons given hereinabove, it is respectfully solicited that the 35 USC §103(a) rejection of claims 1, 3-5, 7-10, 12-14, 16-18 and 20-23 be withdrawn and that these claims to be found allowable.

Claims 2, 11 and 19 stand rejected under 35 USC §103(a) as being unpatentable over Greenwald et al in view of Ferguson (U.S. Patent 5,784,193) as applied to claims 1, 10 and 18 further in view of Knebel et al (U.S. Patent 6,388,807). Applicant respectfully disagrees with this rejection for the reasons given hereinbelow.

Knebel et al disclose the use of conformal laser scanning microscope. However, more particularly, Knebel et al do not fill the void of Greenwald et al and Ferguson in that Knebel et al do not disclose nor suggest applicant's invention recited in independent claims 1, 10, and 18 as "said machine vision techniques including routines for non-human adaptive neural networks that operatively control said robotic system."

Assuming for the sake of discussion, that the references of Greenwald et al, Ferguson and Knebel et al are combinable, even though neither reference makes such a suggestion, the resulting combination would still be devoid of applicant's recited invention of claims 1, 10, and 18 as "said machine vision techniques including routines for non-human adaptive neural networks that operatively control said robotic system."

Claims 2, 11, and 19 are respectively dependent on independent claims 1, 10, and 18, and thus in the context of the independent claims recite further details of applicant's invention. These claims are considered patentably distinguishable for the reasons given for their independent claims.

For the reasons given hereinabove, it is respectively solicited that the rejection of 35 USC §103(a) of claims 2, 11, and 19 be withdrawn and that these claims be found allowable.

Claims 24-26, and 33 stand rejected under 35 USC §103(a) as being unpatentable over Greenwald et al in view of Ferguson (U.S. Patent 5,784,193) as applied to claim 18

further in view of Abdel-Fattah (U.S. 2004/0218798). Applicant respectfully disagrees with this rejection for the reasons given hereinbelow.

Abdel-Fattah et al disclose a video microscopic visualization system and imaging processing and data extraction, as well as processing methods for in situ detailed quantification of depositions of sub-micrometer particles.

In a manner similar to Knebel et al, Abdel-Fattah et al do not fill the void of Greenwald et al and Ferguson. More particularly, Abdel-Fattah et al do not disclose nor suggest applicant's independent claims 1, 10, and 18 reciting "said machine vision techniques including routines for non-human adaptive neural networks that operatively control said robotic system."

Assuming for the sake of discussion that the Examiner's references of Greenwald et al, Ferguson and Abdel-Fattah et al are combinable, even though neither reference makes such a suggestion, the resulting combination would still be devoid of applicant's invention recited in independent claims 1, 10, and 18 as "said machine vision techniques including routines for non-human adaptive neural networks that operatively control said robotic system."

Claims 24-26, and 33 are directly or indirectly dependent on applicant's independent claims, and thus in the context of applicant's independent claims recite further details of applicant's invention. Applicant's dependent claims 24-26, and 33 are

considered patentably distinguishable over the cited references for the reasons given for applicant's independent claims.

For the reasons given hereinabove, it is respectfully solicited that the 35 USC §103(a) rejection of claims 24-26, and 33 be withdrawn and that these claims be found allowable.

In summary, it is believed that claims 1-5, 7-14, and 16-26, as well as claim 33, are in condition for allowance and such allowance is respectfully solicited.

Respectfully submitted

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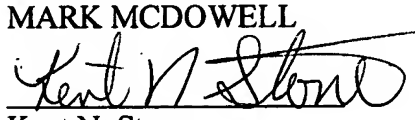
By: 

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